Space Weather Forecast

Issued on Saturday, 25 May 2024 at 00:18 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Minor radio blackouts (R1) likely throughout. Slight chance minor geomagnetic storms (G1): mainly Days 1-3 (25-27 May)

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Moderate, with occasional Moderate-class X-ray flares observed. The largest at 24/0706 UTC from a complex spot group in the southwest.

There are now six numbered sunspot regions on the facing side, with a new unnumbered magnetically unipolar group arriving in the northeast. Analysis of the large southwestern group is now becoming more difficult as it approaches the southwestern solar horizon (due to the viewing angle), however it appears to have shrunk slightly in its central spots. The remaining spots on the disc are smaller, stable and relatively magnetically simple.

The complex sunspot in the southwest produced a slow, small and narrow CME (Coronal Mass Ejection) associated with its M1.4 flare at 24/0706 UTC however initial analysis has determined that it is not expected to impact Earth. There were no other Earth directed CMEs observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds have been indicative of ongoing slow wind conditions. But perhaps late in the period came under the influence of a high speed stream in association with a coronal hole to the northwest of the disc, this is low confidence however and will be monitored in the coming hours.

The solar wind speed was within background levels on a near-level trend for much of the day, nut showed evidence of a slight rise late in the period to slightly elevated levels around 410km/s. The number of particles in the wind was also at background levels. The associated magnetic field was weak-moderate throughout. The north-south component was mainly anti-aligned with Earth's field for much of the day (usually to greater geomagnetic effect), but became aligned with Earth's field into the evening. The net result of the above solar wind measures was Quiet to unsettled (Kp0-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed, despite potentially productive Moderate-class X-ray flares in the southwest.

Four-Day Space Weather Forecast Summary

Solar Activity: Isolated Moderate-class flares remain possible each day, and a slight chance of rising to Strong-class. These are most likely from the sunspot group in the southwest, but two large returning regions may also begin to contribute inside 24 hours' time - with their potency to be confirmed. The very large and active sunspot that produced the Extreme geomagnetic storm of 10-11 May is then due on Monday 27 May. There is some evidence for this region to have remained a potent sunspot group (inferred from far-side CME activity visible from near-Earth satellites), and X-ray flare risks therefore show a definite uptick on the final day of the period.

Solar Wind / Geomagnetic Activity: Southeast-central filament activity from 0600-0630UTC 23 May has resulted in a possible glance from a CME (Coronal Mass Ejection) during the UTC overnight period Day 2 into Day 3 (26-27 May). Confidence in this is notably low. No other CMEs

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.

feature in the forecast.

The coronal hole-based forecast also carries low confidence due its reliance on solar poleward non-persistent features. There is perhaps a Slight Chance of G1 from CH39/- in the next 24 hours, and perhaps a smaller risk again from CH40/+ through Day 3 and perhaps into Day 4 (27-28 May).

Both the above mechanisms combine to give a Slight Chance of G1 Days 1-3 (25-27 May), with the risks highest at first during Day 1 and again in the UTC overnight period Day 2 into Day 3 (26-27 May) - with a respectively mainly 'coronal hole-driven' and then 'CME-driven' rationale.

Energetic Particles / Solar Radiation: Solar radiation storms are considered a daily slight chance should any Moderate or Strong flares materialise. The chance of this occurring is expected to gradually reduce late in the forecast period as the larger spot groups reach the far side. Any surviving portion of the very large G5-producing sunspot group is likely to be too far east to present any significant risk of proton events from Monday 27 May.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.

Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	10	10	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	50	70	70
Very Active	R3 to R5 X	No	5	5	10	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.